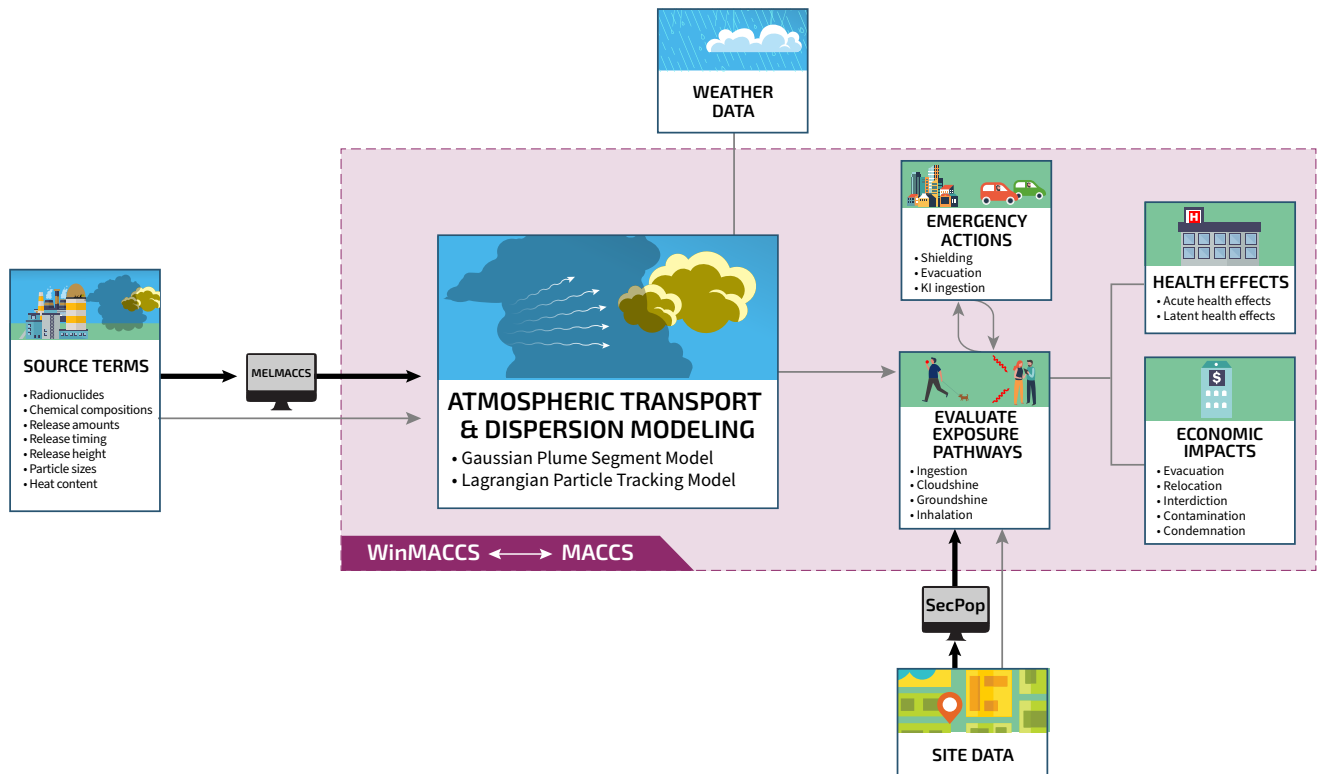




MELCOR Accident Consequence Code System (MACCS)



Depiction of nuclear accident consequence modeling with MACCS: WinMACCS serves as the user interface to MACCS, source terms are processed through MelMACCS, and SecPop generates site data from U.S. census information.

MACCS is a high-fidelity computer code developed to analyze the off-site consequences of an accidental atmospheric release of radioactive material.

ASSESSING THE IMPACT OF SEVERE ACCIDENTS

MACCS was developed at Sandia National Laboratories for the U.S. Nuclear Regulatory Commission (NRC) to simulate the impact of severe accidents at nuclear facilities on the surrounding environment. Designed primarily as a probabilistic risk assessment (PRA) tool, MACCS can sample weather data and generate statistical outputs. Key capabilities include:

- Atmospheric Transport and Dispersion
- Health Effects
- Economic Consequences
- Emergency Response
- Uncertainty Characterization

ATMOSPHERIC TRANSPORT AND DISPERSION MODELING CAPABILITIES

MACCS has the capability to model atmospheric transport and dispersion via two methods:

- Gaussian plume segment model
- Lagrangian particle tracking model which couples MACCS with HYSPLIT

Atmospheric transport and dispersion capabilities of MACCS include:

- Nearfield to farfield transport
- Wet and dry deposition
- Building wake effects
- Plume buoyancy
- Plume meander



HEALTH EFFECTS MODELING CAPABILITIES

MACCS calculates health effects by evaluating several exposure pathways to humans:

- Inhalation
- Cloudshine
- Groundshine
- Resuspension Inhalation
- Ingestion

Doses are evaluated along with increased risks of both acute and latent (cancer) health effects. Multiple dose response model options are available, to include linear no threshold, annual threshold, and piecewise linear.

ECONOMIC CONSEQUENCE MODELING CAPABILITIES

Economic consequence modeling takes into account the total off-site costs of the accident and emergency response, including the following:

- Evacuation and Relocation Per Diem Costs
- Long-Term Relocation cost
- Decontamination Costs
- Loss of Property Use (Interdiction)
- Depreciation During Interdiction
- Condemnation
- Gross Domestic Product (GDP) Losses

EMERGENCY RESPONSE MODELING CAPABILITIES

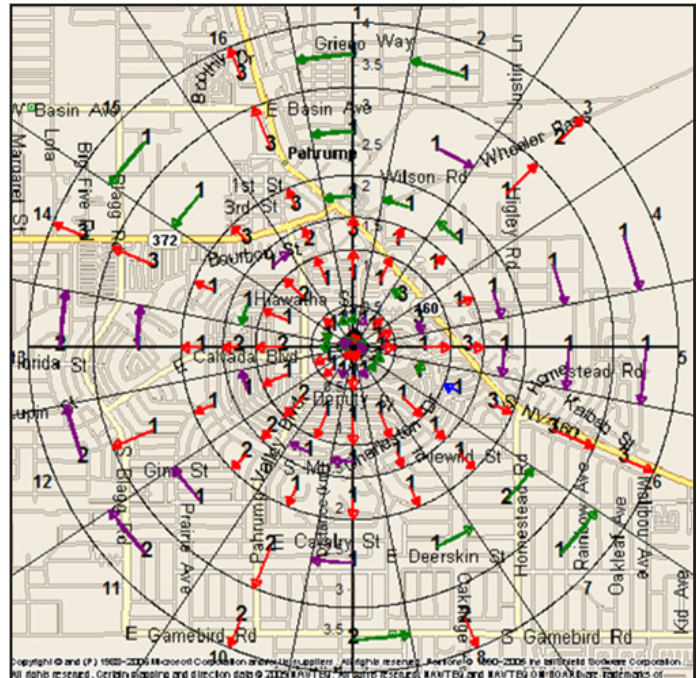
MACCS has the capability to model multiple emergency response actions in order to mitigate the risks to the public, these include:

- Evacuation
- Relocation
- Sheltering/Shielding
- Potassium Iodine (KI) Ingestion

MACCS uses three models to govern public evacuations to mitigate exposure to a radioactive release:

- Radial evacuation directly away from the plant
- Network evacuation that represents a system of roads (depicted to the right)
- Keyhole evacuation that incorporates weather sampling data to prioritize evacuation downwind of the plume

The user has a great deal of flexibility in defining the evacuation routes, speeds, and timing delays for specific groups in the populations (i.e. schools, hospitals, prisons, etc.)



Network evacuation model allowing evacuation paths to follow a representative road network

MACCS FOR ADVANCED REACTORS

MACCS is continually improving to meet our user needs. The MACCS development team is currently working on several advanced reactor initiatives and an overall modernization effort to ensure that MACCS continues to be the premier consequence analysis code now and well into the future. Current advanced reactor initiatives include:

- Nearfield Modeling Enhancements
- Radionuclide Screening for Advanced Reactor Designs
- Source Term Pre-Processor Code Updates

FOR MORE INFORMATION PLEASE CONTACT:

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